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<b>TRANSMITTAL FORM</b> (to be used for all correspondence after initial filing)		Application No.	09/298,064
		Filing Date	April 22, 1999
		First Named Inventor	Guangcai Xing
		Art Unit	1763
		Examiner Name	Rudy Zervigon
Total Number of Pages in This Submission	10	Attorney Docket Number	4887P090

ENCLOSURES (check all that apply)		
<input checked="" type="checkbox"/> Fee Transmittal Form  <input type="checkbox"/> Fee Attached  <input type="checkbox"/> Amendment / Response  <input type="checkbox"/> After Final <input type="checkbox"/> Affidavits/declaration(s)  <input type="checkbox"/> Extension of Time Request  <input type="checkbox"/> Express Abandonment Request  <input type="checkbox"/> Information Disclosure Statement  <input type="checkbox"/> PTO/SB/08  <input type="checkbox"/> Certified Copy of Priority Document(s)  <input type="checkbox"/> Response to Missing Parts/Incomplete Application  <input type="checkbox"/> Basic Filing Fee <input type="checkbox"/> Declaration/POA  <input type="checkbox"/> Response to Missing Parts under 37 CFR 1.52 or 1.53	<input type="checkbox"/> Drawing(s)  <input type="checkbox"/> Licensing-related Papers  <input type="checkbox"/> Petition  <input type="checkbox"/> Petition to Convert a Provisional Application  <input type="checkbox"/> Power of Attorney, Revocation Change of Correspondence Address  <input type="checkbox"/> Terminal Disclaimer  <input type="checkbox"/> Request for Refund  <input type="checkbox"/> CD, Number of CD(s)	<input type="checkbox"/> After Allowance Communication to Group  <input type="checkbox"/> Appeal Communication to Board of Appeals and Interferences  <input checked="" type="checkbox"/> Appeal Communication to Group (Appeal Notice, Brief, Reply Brief)  <input type="checkbox"/> Proprietary Information  <input type="checkbox"/> Status Letter  <input type="checkbox"/> Other Enclosure(s) (please identify below): <div style="border: 1px solid black; padding: 5px; margin-top: 10px;">2 Return receipt postcards</div>
Remarks		

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT	
Firm or Individual name	William Thomas Babbitt, Reg. No. 39,591 BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP
Signature	<i>William T. Babbitt</i>
Date	8/16/04

CERTIFICATE OF MAILING/TRANSMISSION			
I hereby certify that this correspondence is being deposited with the United States Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to: Mail Stop Appeal Brief-Patents, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.			
Typed or printed name	Nadya Gordon		
Signature	<i>Nadya Gordon</i>	Date	August 16, 2004



# FEE TRANSMITTAL for FY 2004

Effective 01/01/2004. Patent fees are subject to annual revision.

☐ Applicant claims small entity status. See 37 CFR 1.27.

TOTAL AMOUNT OF PAYMENT

(\$)

## Complete if Known

Application Number	09/298,064
Filing Date	April 22, 1999
First Named Inventor	Guangcai Xing
Examiner Name	Rudy Zervigon
Art Unit	1763
Attorney Docket No.	4887P090

## METHOD OF PAYMENT (check all that apply)

☐ Check ☐ Credit card ☐ Money Order ☐ Other ☒ None

☒ Deposit Account

Deposit Account Number

02-2666

Deposit Account Name

Blakely, Sokoloff, Taylor & Zafman LLP

The Commissioner is authorized to: (check all that apply)

☒ Charge fee(s) indicated below ☒ Credit any overpayments  
☒ Charge any additional fee(s) or underpayment of fees as required under 37 CFR §§ 1.16, 1.17, 1.18 and 1.20.  
☐ Charge fee(s) indicated below, except for the filing fee to the above-identified deposit account

## FEE CALCULATION

### 1. BASIC FILING FEE

Large Entity		Small Entity		Fee Description	Fee Paid
Fee Code	Fee (\$)	Fee Code	Fee (\$)		
1001	770	2001	385	Utility filing fee	
1002	340	2002	170	Design filing fee	
1003	530	2003	265	Plant filing fee	
1004	770	2004	385	Reissue filing fee	
1005	160	2005	80	Provisional filing fee	
SUBTOTAL (1)					(\$)

### 2. EXTRA CLAIM FEES

Total Claims  - 20\*\* =  X  =   
Independent Claims  - 7 =  X  =   
Multiple Dependent  =

Large Entity		Small Entity		Fee Description	Fee Paid
Fee Code	Fee (\$)	Fee Code	Fee (\$)		
1202	18	2202	9	Claims in excess of 20	
1201	86	2201	43	Independent claims in excess of 3	
1203	290	2203	145	Multiple Dependent claim, if not paid	
1204	86	2204	43	**Reissue independent claims over original patent	
1205	18	2205	9	**Reissue claims in excess of 20 and over original patent	
SUBTOTAL (2)					(\$)

\*\*or number previously paid, if greater, For Reissues, see below

## FEE CALCULATION (continued)

### 3. ADDITIONAL FEES

Large Entity		Small Entity		Fee Description	Fee Paid
Fee Code	Fee (\$)	Fee Code	Fee (\$)		
1051	130	2051	65	Surcharge - late filing fee or oath	
1052	50	2052	25	Surcharge - late provisional filing fee or cover sheet.	
2053	130	2053	130	Non-English specification	
1812	2,520	1812	2,520	For filing a request for <i>ex parte</i> reexamination	
1804	920 *	1804	920 *	Requesting publication of SIR prior to Examiner action	
1806	1,840 *	1806	1,840 *	Requesting publication of SIR after Examiner action	
1251	110	2251	55	Extension for reply within first month	
1252	420	2252	210	Extension for reply within second month	
1253	950	2253	475	Extension for reply within third month	
1254	1,480	2254	740	Extension for reply within fourth month	
1255	2,010	2255	1,005	Extension for reply within fifth month	
1404	330	2401	165	Notice of Appeal	
1402	330	2402	165	Filing a brief in support of an appeal	
1403	290	2403	145	Request for oral hearing	
1451	1,510	2451	1,510	Petition to institute a public use proceeding	
1452	110	2452	55	Petition to revive - unavoidable	
1453	1,330	2453	665	Petition to revive - unintentional	
1501	1,330	2501	665	Utility issue fee (or reissue)	
1502	480	2502	240	Design issue fee	
1503	640	2503	320	Plant issue fee	
1460	130	2460	130	Petitions to the Commissioner	
1807	50	1807	50	Processing fee under 37 CFR 1.17(q)	
1806	180	1806	180	Submission of Information Disclosure Stmt	
8021	40	8021	40	Recording each patent assignment per property (times number of properties)	
1809	770	1809	385	Filing a submission after final rejection (37 CFR § 1.129(a))	
1810	770	2810	385	For each additional invention to be examined (37 CFR § 1.129(b))	
1801	770	2801	385	Request for Continued Examination (RCE)	
1802	900	1802	900	Request for expedited examination of a design application	

Other fee (specify) \_\_\_\_\_

\* Reduced by Basic Filing Fee Paid

SUBTOTAL (3)

(\$)

## SUBMITTED BY

## Complete (if applicable)

Name (Print/Type)	William Thomas Babbitt	Registration No. (Attorney/Agent)	39,591	Telephone	(310) 207-3800
Signature	<i>William T. Babbitt</i>	Date	08/16/04		

Based on PTO/SB/17 (10-03) as modified by Blakely, Sokoloff, Taylor & Zafman (wlr) 02/10/2004.  
SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450



Attorney Docket No. 004887P090

THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of:

Guangcai Xing, et al.

Application No.: 09/298,064

Filed: April 22, 1999

For: APPARATUS AND METHOD FOR  
EXPOSING A SUBSTRATE TO  
PLASMA RADICALS (AMAT NO.  
2616 US/RTP/LE)

Examiner: Zervigon, Rudy

Art Unit: 1763

Confirmation No.: 1649

**REPLY BRIEF**

Mail Stop Appeal Brief-Patents  
Commissioner for Patents  
Post Office Box 1450  
Alexandria, Virginia 22313-1450

Dear Sir:

In response to the Examiner's Answer mailed June 16, 2004, Applicant submits, in triplicate, the following Reply Brief pursuant to 37 C.F.R. 1.193(b)(1). The Reply Brief utilizes heading consistent with the Appeal Brief.

**VII. GROUPING OF CLAIMS**

The Examiner's Answer disputed Applicant's grouping of claims. Applicant groups the claims as follows:

Group I - Claims 1-4;

Group II Claim 5;

Group II Claims 6-7;

Group IV      Claims 17-18; and

Group V      Claim 20.

With respect to Group II (claim 5), the Appeal Brief clearly shows why claim 5 was separately patentable from claims 1-4. Specifically, claim 5 argued not only the reasons related to the patentability of claim 1, but also that there was no motivation to combine the teachings of Yamazaki, with respect to film deposition with the teaching of Matsuo directed toward etching silicon. Appeal Brief, page 7. Yamazaki taught film deposition and Matsuo taught etching or material removal.

Similarly, with respect to Group V (claim 20), the Appeal Brief noted a distinct ground for patentability, namely that Moslehi did not describe a machine-readable storage medium containing program instructions including transferring plasma radicals into a chamber substantially free of ions.

Applicant respectfully requests that the Patent Office consider the grouping proposed in Applicant's Appeal Brief.

## **VIII. ARGUMENTS**

### **B.      Group I: Rejection of Claims 1-4 under 35 U.S.C. §§ 102(b) or 103(a)**

In the Appeal Brief, Applicant argued that claims 1-4 were not anticipated by and were not *prima facie* obvious over Matsuo, because Matsuo does not describe:

- 1)      a second reaction chamber adapted to house a substrate for film formation;
- 2)      a first reaction chamber coupled to a second reaction chamber and separated by a distance equivalent to the lifetime of nitrogen ions at a plasma generation rate so that nitrogen radicals react with the substrate in a film conversion step.

With respect to a second chamber housing a substrate for film formation, the Patent Office takes the view that the "film formation" description is an intended use. Applicant believes that the phrase "film formation" to describe a chamber, describes a particular type of chamber and is thus a structural limitation. For example, it is well known in the semiconductor processing industry that there are film formation (e.g., deposition) chambers and film removal (e.g., etch) chambers. Claim 1 is directed to that class of chambers used in the semiconductor processing industry for film

formation. Matsuo describes a film removal chamber—a different class of chambers. The citation by the Patent Office of In re Casey, 152 USPQ 235 (CCPA 1967) is distinguishable. In re Casey held that the manner or method in which a machine (an adhesive tape dispenser) is to be utilized is not germane to the issue of patentability of the machine itself. See id. at 238. The structural limitation of the claim asserted in In re Casey was apparently similar to the prior art and it was the functional use of the structure that the Applicant sought to distinguish its invention from the prior art. Claim 1, on the other hand, provides a structural limitation in the form of a particular class of chambers (film formation chambers). Applicant is not relying on a functional use of a generic chamber. Matsuo teaches an etching environment.

The Patent Office does not dispute that Matsuo is clearly directed to removal (etching) of silicon. The Patent Office seeks to find film formation in the production of a reaction layer during the removal step. It is clear, however, that material (silicon) is being removed and that Matsuo does not teach the formation of a film beyond the obviously transient nature of a chemical reaction to remove silicon.

With respect to coupling the second reaction chamber to a first reaction chamber separated by distance equivalent to the lifetime of nitrogen ions at a plasma generation rate equivalent to the lifetime of nitrogen ions such that nitrogen radicals react with the substrate in a film conversion step, the Patent Office has not cited anywhere in Matsuo that teaches radicals from a nitrogen gas reacting with a substrate.

[E]ven though nitrogen plays a profound role in the etching of silicon, it is not incorporated in a stable reaction layer.

Matsuo at 1806. Even if nitrogen is present in the reaction layer, Matsui does not teach that nitrogen radicals are present.

Matsuo teaches when nitrogen is used, no separation between a first chamber and a second chamber produces the best results when nitrogen is added. Further, Matsuo did not teach that the effect of nitrogen was for radicals to react with a substrate in a film conversion step. Matsuo did not describe nitrogen radicals reacting with a substrate so was not directed at separating its chambers to achieve this reaction.

C. Group II: Rejection of Claim 5 under 35 U.S.C. § 103(a)

Claim 5 was rejected under 35 U.S.C. § 103 as obvious over Matsuo in view of Yamazaki. Yamazaki was cited for describing a plasma reaction apparatus for film deposition. Applicant points out, as noted above, that there would be no motivation to combine Yamazaki and

Matsuo. The references are entirely different in terms of the environment in which their teachings seek to act (deposition vs. etching). It is not conceivable that persons of skill in the art looking to remove silicon would turn to the teachings of Yamazaki and film deposition (not removable) for guidance.

D. Group III: Rejection of Claims 6-7 under 35 U.S.C. §§ 102(b) or 103(a)

In the Appeal Brief, Applicant asserted that claims 6 and 7 were not anticipated by or obvious over Matsuo, because Matsuo did not teach:

- 1) a second reaction chamber having means for housing a substrate for film formation processing; and
- 2) means for providing the plasma to the second reaction chamber substantially free of nitrogen ions such that the nitrogen radicals react with a substrate in a process conversion step.

With respect to the second reaction chamber having means for housing a substrate for film formation processing, this limitation describes a specific type of chamber; a chamber where films are put on a substrate. Matsuo describes an etching environment where silicon is being removed.

With respect to the means for providing the plasma to the second reaction chamber such that nitrogen radicals react with a substrate in a process conversion step, Matsuo does not teach nitrogen radicals reacting with a substrate.

E. Group IV: Rejection of Claims 17-18 under 35 U.S.C. § 102(b)

In the Appeal Brief, Applicant asserted that claims 17 and 18 were not anticipated by Moslehi, because Moslehi does not describe a system including a first reaction chamber and a second reaction chamber that are separated by a distance equivalent to the lifetime of nitrogen ions at a plasma generation rate such that radicals react with a substrate in the second chamber in a film conversion step. Applicant believes the separation between the chambers in claims 17 and 18 is a structural limitation, and, with the controller, memory, and instructions for controlling a gas source and an energy source to convert a portion of a nitrogen gas into a plasma including radicals

distinguishes claims 17 and 18 from Moslehi. Moslehi teaches preferably introducing both charged and neutral species to a process chamber. It does not follow that by introducing both charged and neutral species to a process chamber that Moslehi teaches introducing radicals that can react with a substrate in the process chamber in a film conversion step.

F. Group V: Rejection of Claim 20 under 35 U.S.C. § 102(b)

In the Appeal Brief, Applicant asserted that claim 20 is not anticipated by Moslehi, because Moslehi does not describe a machine-readable storage medium containing program instructions including transferring plasma radicals of nitrogen via a distance equivalent to the lifetime of nitrogen ions into a chamber substantially free of ions. Moslehi teaches introducing both charged and neutral species to a process chamber. Therefore, Moslehi does not teach program instructions to deliver plasma radicals into a second chamber substantially free of ions.

**IX. CONCLUSION AND RELIEF**

Based on the foregoing, Applicant respectfully requests that the Board overturn the rejection of all pending claims and hold all the claims with the present application allowable.

Respectfully Submitted,

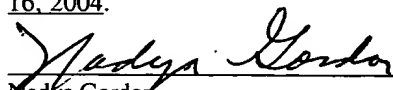
BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

Date: August 16, 2004

  
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I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Mail Stop Appeal Brief-Patents, Assistant Commissioner for Patents, Washington, D.C. 20231 on August 16, 2004.

 8/16/04  
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Nadya Gordon Date